



**US Army Corps
of Engineers.**
Engineer Research and
Development Center

Fact Sheet

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CONDITION AND PERFORMANCE ASSESSMENT FOR COASTAL BREAKWATERS AND JETTIES

The Problem

The U.S. Army Corps of Engineers maintains several hundred coastal navigational and protection structures, including breakwaters and jetties. Many of these structures have been in place since the early 1900s and have sustained gradual deterioration or storm damage. Corps personnel responsible for maintenance and repair (M&R) of these structures face tough decisions about project prioritization and efficient allocation of scarce funds.

The Technology

To help those involved in M&R project planning and budgeting, the U.S. Army Construction Engineering Research Laboratory (CERL) worked with Corps Districts and Divisions to produce a rational, systematic, and standardized set of procedures for evaluating the physical condition and functional performance of rubble breakwaters and jetties. This was accomplished as part of CERL's effort in the Corps' Repair, Evaluation, Maintenance, and Rehabilitation (REMR) research program. The assessment system emphasizes structure performance, which is consistent with the goals of the Corps' Performance Measurement Guidebook (August 1995).

The eight main steps in applying the system begin by establishing which of the 11 defined functions a structure was intended to perform, and then, what level of performance should be expected for each function. Next is determining the level of physical condition required to attain acceptable performance for each function. For management convenience the structure is divided along its length into reaches which are then inspected according to system rules and rated according to the standard rating tables provided. After the physical inspection comes the functional or performance assessment, also done with the help of standard rating tables. The last step is to review structural requirements, with the objective that over time, a good relationship between physical condition and functional performance will be developed for each structure.

The assessment system features a 100-point Condition Index (CI) for rating the structure on physical condition and functional performance (see CERL Fact Sheet CF-22, The Condition Index). The ratings are determined according to guidelines that appear in the system manual. During the structure inspection, other observation on the character and extent of defects are also recorded. The inspection information is then entered into the BREAKWATER computer program which computes the index values from the ratings supplied by the inspector and District staff. The program also stores basic structure

inventory, keeps each inspection record along with related comments, and prints a variety of reports to assist with repair analysis and for other reporting needs.

Benefits/Savings

The REMR assessment procedures for rubble breakwaters and jetties will provide improved and more consistent methods for: (1) selecting the most appropriate repair actions for a given budget level, (2) relating physical condition to structure performance, and (3) monitoring the condition and performance of these structures over time. The ultimate goal is to achieve the best possible performance for breakwater and jetty structures at any funding level. The BREAKWATER program provides a means for keeping inspection records together over time and in a consistent format, thus helping maintain a good historical database as well as assisting the tracking of changes in condition and function over time.

Status

The condition rating procedures for rubble breakwaters and jetties are being implemented within the U.S. Army Corps of Engineers. The initial version of the management computer program (called BREAKWATER) is completed and is available on CERL's REMR Internet site: <http://www.cecer.army.mil/fl/remr/remr.html>. Condition and performance rating procedures for other coastal structures are under development, with enhanced versions of the management program to follow.

Point of Contact

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